

EUROPEAN MICROWAVE WEEK 2015

SIX DAYS • THREE CONFERENCES • ONE EXHIBITION

PALAIS DES CONGRÈS, PARIS, FRANCE
SEPTEMBER 6 - 11, 2015

Exhibition Opening Hours:

- Tuesday 8th September: 9.30 – 18.00
- Wednesday 9th September: 9:30 – 17.30
- Thursday 10th September: 9:30 – 16.30

PMSE in France

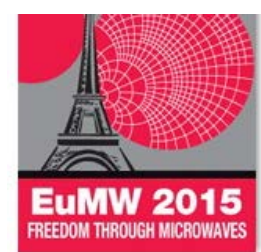
Laurent BODUSSEAU

Head of Planning Studies and European Affairs

Agence Nationale des Fréquences

Laurent.bodusseau@anfr.fr

WM08 - PMSE Workshop at EuMW2015



Organisation of the PMSE spectrum management in France

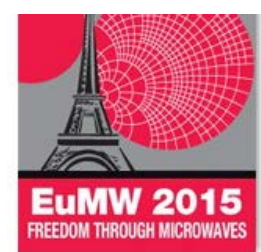
ANFR

- International Negotiation
- National Frequency Allocation Table (annex 8 for PMSE)
- Address ARCEP spectrum needs

ARCEP

- National regulatory framework for PMSE based European Decisions (EC, CEPT) and recommendations (CEPT)
- Address PMSE spectrum needs

- Temporary licensing is managed under an agreement between ANFR- ARCEP



PMSE ?

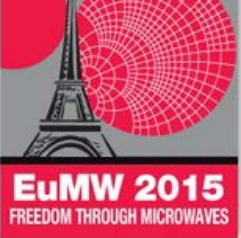
- Audio

Wireless microphones, Talk back, in ear-monitors

- Video

Wireless cameras, video links

Differents needs = differents frameworks



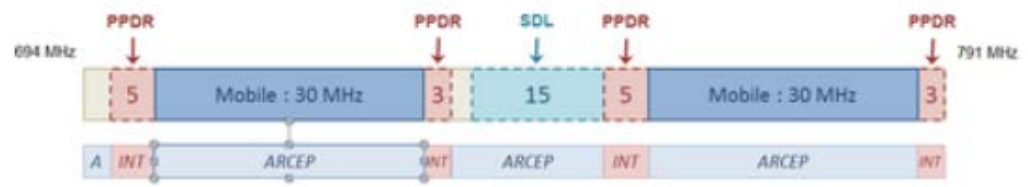
Current situation on Audio in France

□ General authorization (License exempt)

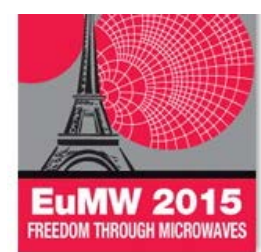
➤ Spectrum and national regulatory Framework

- 174-223MHz ARCEP decisions [n° 2010-0849](#) and [n° 2010-0850](#)
- 470-694MHz , 694-789MHz, 823-832MHz and 1785-1805MHz ARCEP Decision [n° 2015-0830](#) (reflecting the EC decision 2014/641/UE)
- More information on ARCEP website (<http://www.arcep.fr/?id=10887>)
- **700MHz**

End of PMSE usage in the 700MHz by 2019 (see ARCEP Decision n° 2015-0830)



<http://www.anfr.fr/fr/planification-international/etudes/compatibilite/bande-700-mhz.html>



A more efficient usage of the current Audio spectrum

- ❑ Optimisation of the current spectrum under license exempt regime ?
 - Operational planning ?
 - Segregation ?
 - types of use (IEM, talkbacks, Microphones, ...) ?
 - types of PMSE users (news gathering , localized fixed interview spots, theaters...)?
 - user profile (permanent or visiting, long term use , short term use ...)?
 - Receiver issue? Impact of RED Directive?
 - Can we improve the receiver sensitivity and selectivity ?
 - Handle more interference levels ?
 - Digital equipment ? Which context? Why?
- ❑ 1785-1 805 MHz
 - Mainly use for conference rooms/centers

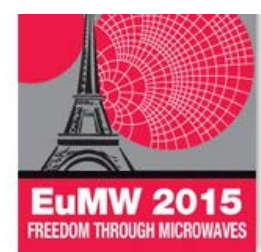
Some others considerations ...

Wireless microphones issues

- Tuning range ?
- Price of Equipment ?
- Blocks of spectrum vs continuous spectrum?
- Issues with price , big event ?

Example : Continuous or distinct blocks?

- Rule of thumb without planning : 1 Microphone per MHz
- when using a minimum of planning : 12 microphones per 8MHz (provided by the manufacturer)
- Taking into account of the intermodulation issues. Our simulations on 64MHz shows that we could fit:
 - 42 microphones in 1 block of 64MHz
 - 46 microphones in 2 blocks of 32MHz
 - 65 microphones in 4 blocks of 16MHz
 - 78 microphones in 8 blocks of 8MHz
- Similarly harmonization of frequencies can cause issues during large international events
- Noting that price of equipment will increase with tuning range required!



Exploring a way forward for the audio side : a tool box

- New frequency bands within L band (see on going CEPT activities): 1375-1400 MHz
- Digital Single Market : Usage of digital technologies ?
- Improving receivers selectivity ?
- Reduce power ?
- Increasing receiver sensitivity ?
- Segregation of use ?
- Coordinated method ?



Current situation on video (focus on camera)

❑ Individual license More information on ARCEP website (<http://www.arcep.fr/index.php?id=11380>)

❑ Annex 8.2 of the French National Frequency Allocation identifies 8 Frequencies within the band 2-2.5 GHz for video

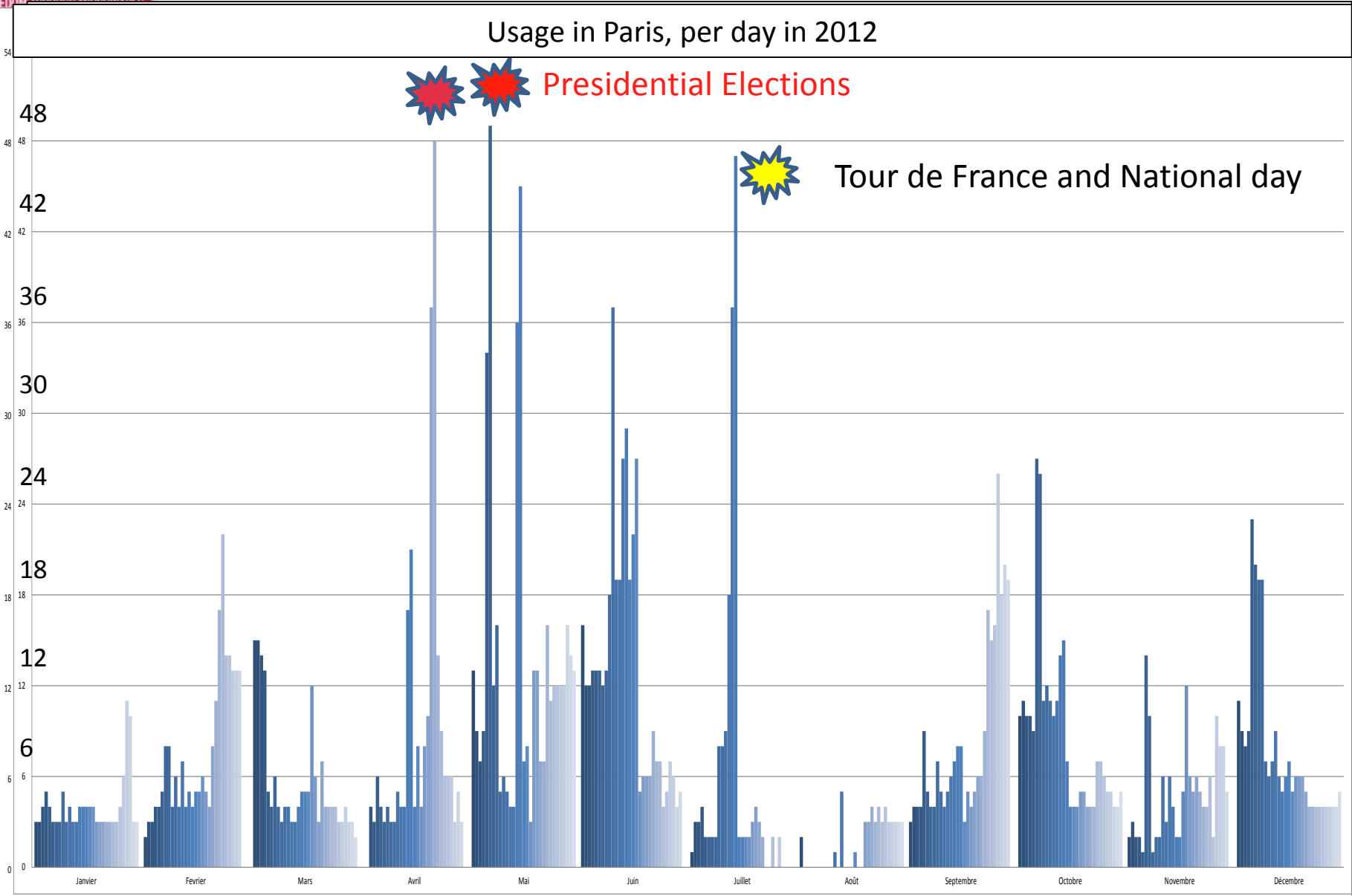
- 2 shared with Wi-Fi (2400-2483.5 MHz)
- One frequency within 2,3-2,4GHz

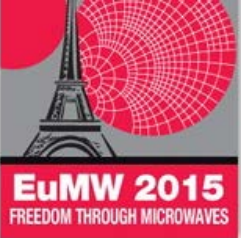
September 7, 2015

Center Frequency	Direction of communication	Comments :
		digital modulation 10MHz bandwidth maximum unless specified
2 065 MHz	AIR - Ground	EIRP 10 dBW maximum, Gain : 3 dBi maximum; exclusion zone : 30 km radius centered on Aussaguel (43° 25' 43" N - 001° 29' 58" E)
2 105 MHz		
2 295 MHz	GROUND - GROUND	
2 305 MHz	ANY	
2 465 MHz	GROUND - GROUND and GROUND - AIR	some exclusion zones
2 475 MHz		
2 055 MHz	GROUND - GROUND	EIRP : 10 dBW maximum; Gain : 3 dBi maximum; only usable within 30 km of Notre-Dame de Paris.
2 095 MHz		
7 110-7 250 MHz	ANY	10 MHz and 20 MHz possible
10 569 MHz	ANY	
10 579 MHz		
24 255 MHz - 24 445 MHz	ANY	20 Channels



Actual usage of video links





Focus : Video at The Tour de France in 2011

	Part of the current PMSE pool of channels											
Number of Frequencies per band	2065 MHz	2105 MHz	2295 MHz	2305 MHz	2465 MHz	2475 MHz	2055 MHz	2095 MHz	7110-7250 MHz	7792 MHz	7848 MHz	Total
2 au 24 juillet 2011 : Tour de France	2	1	0	3	1	0	0	0	5	1	1	14
Access to Spectrum post 2011	2	1	1	3	1	1	1	1	5	1	1	18
	Borrowed											
Number of Frequencies per band	1460-1484 MHz	1635 MHz	2010-2025 MHz	2310-2400 MHz	2415 MHz	2490 MHz	2500-2570 MHz and 2620-2690 MHz (mobile telephonie FDD)	2570-2620 MHz (mobile telephonie TDD)	3400-3800 MHz	Total		
2 au 24 juillet 2011 : Tour de France	2	1	1	1		1	12	2	9	29		
Access to Spectrum post 2011	0	1	1	0 (TBC)		1	0	0	0	3		

- Existing pool of Frequencies not fully used
- Borrowed 29 additional channels to satisfy the demand
- Towards the lost of 43% of the channels for the Tour de France (2.6GHz, 3.4-3.8GHz)
- How to respond to the needs with less spectrum ?



Actual usage of video links

Number of assignments for video services									
Years	Frequency Bands								
	1.5GHz		2GHz			3.5GHz		7GHz	
	1.4GHz-1.5GHz	1.6GHz	2-2.3GHz	2.3-2.5GHz	2.5-2.7GHz	3.4-3.6GHz	3.6-3.8GHz	7.1-7.2GHz	7.7-7.8GHz
2010	26	0	412	280	110	16	32	11	3
2011	25	0	396	364	165	30	43	9	2
2012	21	2	832	501	143	74	50	38	27
2013	...								
2014	9	2	1019	538	188	93	53	59	0
2015 (6 months)	32	9	474	368	86	92	36	39	5

- Current spectrum demand : Preferred Frequency Range : 2 GHz
- Existing RF modules with a tuning range of 300MHz or 500MHz between 1GHz to 8.1GHz are available on the market



Video Camera : additional Spectrum ?

- Identification of airborne channels?
- How to consider more permanent use of channels (very long terms...) ?
- Visiting vs local broadcasters ?

How ?

❑ 2010-2025 MHz

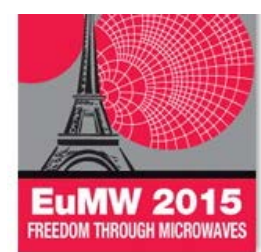
- EC Decision on video PMSE under finalisation based on CEPT study (Oct 15)

❑ 2700-2900 MHz : *"how to share the band with radars?"*

- Identified in France in 2012
- 1.5 year sharing/compatibility studies with Defense, weather, Civil Aviation radar system and Radio Astronomy monitoring equipment.
- Possibility to have access to this band by the end of 2015 in France
- Regulatory framework for video PMSE under study
- ANFR is willing to carry out tests and invites manufacturers / users to come forward to contribute to a campaign measure (validating the exclusion zones and footprint seen by a radar
- **EC granted a mandate to CEPT in July 15: possible future harmonized framework**

❑ L band : **1375-1400 MHz** in France (CEPT **1350-1400 MHz** according to national radars usage)

- Awaiting for the results of the studies within CEPT for wireless microphones **(and video cam?)**



ANFR Special Events operation services

- ❑ ANFR provides spectrum management support (Tour de France, Roland Garros, 24H du mans, EURO 2016...)
 - Planning
 - Licensing
 - Operation (testing and tagging)
 - Interference resolution

 - Contact Christian.dupart@anfr.fr for further information on the services offered
 - For Frequencies contact tempo@anfr.fr
- or + 33 (0)1 45187738 / + 33 (0)1 45187739



Conclusions

- 700 MHz : ANFR contributes towards a seamless transition phase in France
- ANFR is active at CEPT level (national preparatory meetings)
 - L band issue flexibility in 1350-1400 MHz for wireless microphones (video camera ?) – in France 1375-1400MHz
 - 2.7-2.9 GHz band a future opportunity for video camera – ANFR will contribute to CEPT response to EC mandate
- A PMSE expertise within ANFR : regulatory, licensing, spectrum planning, operational
- ANFR provides spectrum management services for special events